

# SATELLITE FREQUENCY CONVERSION CHART

The satellite television industry delivers its signals using communications satellites in geosynchronous orbit above the earth occupying geostationary position. The United States of America uses the following frequencies for its C-Band, and Ku-Band downlinks. Each type of satellite receiver uses a different mixing frequency to convert the signal to a common IF “Intermediate Frequency” for de-modulation in the satellite receiver. In most cases the Ku-Band is converted to a lower frequency at the dish as part of the feed horn electronics. This device is commonly known as an LNB (Low-Noise Block Down-Converter) and makes the handling of the satellite signals much easier because the frequency band is lower. The down-conversion process reduces the signal frequency down into the L-Band that occupies 950 MHz to 1450 MHz and allows for the use of smaller less expensive coaxial cable and longer runs to the satellite receivers.

| Satellite Transponder Polarization V | Ku-Band MHz | Satellite Transponder Polarization H | C-Band MHz | L-Band MHz |
|--------------------------------------|-------------|--------------------------------------|------------|------------|
|                                      | 12200       |                                      | 3700       | 1450       |
| 1                                    | 12180       |                                      | 3720       | 1430       |
|                                      | 12160       | 2                                    | 3740       | 1410       |
| 3                                    | 12140       |                                      | 3760       | 1390       |
|                                      | 12120       | 4                                    | 3780       | 1370       |
| 5                                    | 12100       |                                      | 3800       | 1350       |
|                                      | 12080       | 6                                    | 3820       | 1330       |
| 7                                    | 12060       |                                      | 3840       | 1310       |
|                                      | 12040       | 8                                    | 3860       | 1290       |
| 9                                    | 12020       |                                      | 3880       | 1270       |
|                                      | 12000       | 10                                   | 3900       | 1250       |
| 11                                   | 11980       |                                      | 3920       | 1230       |
|                                      | 11960       | 12                                   | 3940       | 1210       |
| 13                                   | 11940       |                                      | 3960       | 1190       |
|                                      | 11920       | 14                                   | 3980       | 1170       |
| 15                                   | 11900       |                                      | 4000       | 1150       |
|                                      | 11880       | 16                                   | 4020       | 1130       |
| 17                                   | 11860       |                                      | 4040       | 1110       |
|                                      | 11840       | 18                                   | 4060       | 1090       |
| 19                                   | 11820       |                                      | 4080       | 1070       |
|                                      | 11800       | 20                                   | 4100       | 1050       |
| 21                                   | 11780       |                                      | 4120       | 1030       |
|                                      | 11760       | 22                                   | 4140       | 1010       |
| 23                                   | 11740       |                                      | 4160       | 990        |
|                                      | 11720       | 24                                   | 4180       | 970        |
|                                      | 11700       |                                      | 4200       | 950        |

As you can see each of the frequencies are separated by 20 MHz, however each transponder occupies 40 MHz of bandwidth to transmit a channel. However two different signal polarizations are used, both “Vertical” and “Horizontal” and they overlap the frequencies by half. The Horizontal polarization skips every other frequency and the Vertical polarization uses all the others. Use of polarization in the transmitted signal provides an extra 20 dB minimum loss in the receiver to reduce crosstalk between the desired channel and the adjacent channels. So that channel 1 can occupy 12200 – 12160 and channel 2 can occupy 12180 – 12140 and so on. Please note that Directv and Dish TV use a different frequency plan for their down-links.

The mixer frequencies that are used to get from one band to another are as follows. To get from Ku-Band to the L-Band you would use 10750 MHz as a Local Oscillator mixer frequency, and to get from C-Band down to L-Band you would use 5150 MHz as a Local Oscillator mixer to down convert to L-Band. The lower product of the mixer is always used to avoid the harmonics of the signal and to keep it from interfering with the converted signal.

The advantages of using an LNB at the dish and conversion to the L-Band are mostly driven by the lower cost cable and the technology used in the satellite receivers costs less to produce lowering the cost of the receivers.

If you are using an L-Band satellite system you may wish to install a level monitor to alert you when your signal is beginning to fade before you have a total signal loss.

The SLM-771 is an L-Band Satellite Level Monitor designed to detect measure and report the receiving level of any RF signal from 5MHz up to 2.5GHz. Use it for early warning of satellite dish and LNB signal degradation due to snow loading, bug & bird intrusions, dish misalignment due to wind or movement, and any increase in LNB loss for whatever reason. It will alert you to the signal reduction before a system failure occurs.



The unit is fully RF shielded and can be mounted in the front or rear of your rack.

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